CHAPTER

1

Understanding the Basics

This chapter provides a short overview of the basic parts of a TQL query and the components and optional statements in a query string and includes:

Introducing TQL

The Troux Query Language (TQL) supports two types of queries:

- component queries that return only components
- relationship queries that return only relationships

Queries are built with clauses and conjunctions.

In views, a component query is used to return a set of components. A relationship query may also be used to exclude specific relationships from the view. If no relationship query is specified, then all relationships of the returned components are accessible in the view.

TQL Format

When creating a query, you can use white space and new lines to format the query because the spaces are ignored. Comments are indicated by two dashes (--). The text after the dashes to the end of a line is not evaluated.

To escape quotes and double-quotes in strings:

- Strings surrounded by single quotes use two consecutive single quotes in the string to represent a single quote. For example: 'Select the Computers''s Operating System' will read as Select the Computer's Operating System.
- Strings surrounded by double quotes use two consecutive double-quotes in the string to represent a single double-quote. For example "The Terminal Says, ""Please Enter Your User ID."" will read as The Terminal Says, "Please Enter Your User ID."

There is no case-sensitivity in TQL. This applies to TQL commands, parameter names, values used with component names, property names and property values.

TQL clauses for component and relationship core attributes use operators and values to specify the criteria for the results.

Queries often use component and relationship clauses together to return sets of components or relationships.

Conjunctions

Conjunctions combine clauses or change the order in which they are evaluated. The following table defines valid TQL conjunctions.

Conjunction	Definition
`clause1 and clause2`	Use **and** to return only those objects that are returned by both *clause1* and *clause2*.
`clause1 or clause2`	Use **or** to return objects that are returned either by *clause1* or by *clause2*.
`not clause1`	Use **not** to return only those objects that are not returned by *clause1*.
`(clause1 or clause2) and clause3`	Use parenthesis to change the order of evaluation. The standard order of evaluation is not, and, then or. For clarification, it is best to always use parenthesis even if the query follows the standard order of evaluation. In this example, the or phrase in the parenthesis would be evaluated before the and phrase.

Using Property and Category Names

Component and relationship properties may be organized into categories and subcategories. Properties are identified by their category and property name using dot-notation. For example, if a component type has a property named "USDollars" in subcategory "Currency" under category "Cost", then the full name of the property would be "Cost.Currency.USDollars".

Note that if a property or category has a dot in its name, those dots must be escaped. For example a property named "first.last" in a category "full.name" would be written "full\.name.first\.last".

Using Values

A value is an expression used in comparisons with component and relationship core attributes. TQL supports the following kinds of values:

- string literals in quotes (`"abc", "17"`)
- numeric literals (`12.568, -15.8, 0`)
- boolean literals (`true / false`)
- datetime literals (`01-01-2004, 12-15-1972`)
- parameters (e.g. `parameter("MachineName")`)
- USERNAME macro (username for current user)

For values, use single or double quotes. See Parameters on page 15 for more information on parameter values.

The USERNAME macro is a variable that evaluates to the user ID specified for user authentication. For example, if Bob Smith logs in as "bsmith" the variable would evaluate to "bsmith". If using the out-of-the-box configuration for user authentication, this is the Tomcat username ID. If using an external authentication tool such as Windows NT, the USERNAME returned is the Windows NT user ID. For example, the clause `component.property("owner") = USERNAME` would return all components where the value of the property named *owner* is equal to the username of the currently logged in user.

Using Operators

Operators are used in clauses to compare values to component and relationship core attributes. The following table lists valid TQL operators.

Operator	Definition
=	Equal to
!=	Not equal to
<	Less than
>	Greater than
<=	Less than or equal to
>=	Greater than or equal to
`contains`	Contains the value as a substring (not available for boolean, datetime, or numeric data)

Operators use the following orderings by default:

- case-insensitive, alphabetical ordering for string literals
- numeric ordering for numeric literals
- numeric ordering for boolean literals (where true=1, and false 0)

Operators can be explicitly included in a clause or a user can select one with an operator picker. For more information see *Working With Parameter Selectors* on page 22.

CHAPTER

2

Working with Components

This chapter covers the TQL clauses for working with component attributes and includes:

Understanding Component Queries

Component queries are used to return all components in the system that match a specified component attribute such as a component name, a relationship type, or a range of component attributes defined by values and operators.

Working With Component Core Attributes

Component core attributes include: id, name, description, type, property, and the presence of events. The following clauses compare these core attributes with values and return the components that match the specified criteria.

component.id

Returns all components whose id's match the specified operator and value.

All components have id's that are used as internal keys and are not accessible through the Troux Blueprinting System user interface. However, if accessing the Troux Blueprinting System through the SOAP APIs, you can access these id's and use them in TQL with the following operators:

- `component.id = value`
- `component.id != value`
- `component.id contains value`
- `component.id > value`
- `component.id < value`
- `component.id >= value`
- `component.id <= value`

component.name

Returns all components whose names match the specified operator and value:

- `component.name = value`
- `component.name != value`
- `component.name contains value`
- `component.name > value`
- `component.name < value`
- `component.name >= value`
- `component.name <= value`

component.type

Returns all components whose type matches the specified operator and value. If the type specified has subtypes, all components of that type or of its subtypes are returned.

For example, consider the following set of component types:

- Database
  - SQL
    - 7.0
    - 2K
  - Oracle
    - 7.3.4
    - 8i

With these component types, the clause component.type="Database" returns components of all the types shown; the clause component.type="Oracle" returns components of subtype Oracle, subtype 7.3.4, and subtype 8i; and the clause component.type="8i" returns only components of the subtype 8i. TQL usage for `component.type` includes the following operators and values:

- `component.type = value`
- `component.type != value`
- `component.type contains value`

component.exactType

Returns all components that are of an exact component type (does not include subtypes). TQL usage for usage for `component.exactType` includes the following operators and values:

- `component.exactType = value`
- `component.exactType != value`
- `component.exactType contains value`

component.property

Returns all components that have a property operator and value. A parameter can be used for the property name.

- `component.property("property_name",datatype) = value`
- `component.property("property_name",datatype) != value`
- `component.property("property_name",datatype) contains value`
- `component.property("property_name",datatype) > value`
- `component.property("property_name",datatype) < value`
- `component.property("property_name",datatype) >= value`
- `component.property("property_name",datatype) <= value`

A property can have one of the following data types:

- string - a quoted text string
- numeric - a number value (can have decimal)
- boolean - either true or false
- link - link with a fully-qualified URL (such as http://www.troux.com)
- datetime - a date/time stamp
- Custom property types - lists of defined values. Custom property lists are named and must be called out specifically by name in the format: `propertyType (property_type_name)`.

Properties are arranged in categories and subcategories, and are identified according to their category and property name in dot-notation. For example, if a component type has a property named "USDollars" in subcategory "Currency" under category "Cost", then the full name of the property would be "Cost.Currency.USDollars".

Note that if a property or category has a dot in its name, those dots must be escaped. For example a property named "first.last" in a category "full.name" would be written "full\.name.first\.last".

component.hasEvent

Returns all components that have events with the specified severity or worse (from info through catastrophic).

For example, if you specify "warning" for the severity, components with warning events, failure events, and catastrophic events are returned:

- `component.hasEvent(info)`
- `component.hasEvent(success)`
- `component.hasEvent(warning)`
- `component.hasEvent(failure)`
- `component.hasEvent(catastrophic)`

For more information on events, see the *Troux 4 Blueprint Manager User Guide.*

Working With Component Hierarchies

Components are organized within hierarchies of parent and child levels. The following clauses evaluate components' hierarchical placement and return the components that match the specified criteria.

component.topLevel

Returns all components that have no parent components:

- `component.topLevel`

component.hasAncestor

If component query returns any components, all descendants of those components (at any depth) are returned:

- `component.hasAncestor(`*`component_query`*`)`

component.hasDescendant

If component query returns any components, all ancestors of those components are returned.

- `component.hasDescendant(`*`component_query`*`)`

component.hasParent

If component query returns any components, all of the immediate children of those components are returned.

- `component.hasParent(`*`component_query`*`)`

Working With Component Sets

The following clauses define and return sets of components. Once a set is defined according to a component query and named it can be referenced by that name in other TQL statements. The following clauses compare these sets and return groups of components that match the specified criteria.

define.component.set

When building a complex query, sometimes you may need to repeat the same sub-query several times. Rather than repeating the sub-query, it is easier and more efficient to perform the sub-query once and name it as a set. Then, you can reference the set by name multiple times in your query. You can define any number of sets, but all set definitions must occur at the beginning of a query.

In the component query returns any components, they are defined as a named set:

- `define.component.set("`*`set_name`*`", `*`component_query`*`)`

component.set

Once a component set is defined, this clause returns all components in the named set:

- `component.set("`*`set_name`*`")`

Working With Relationship in Component Queries

Relationships describe the interdependencies that components have with one another. Every relationship is between two components and a component may have multiple relationships each to one other components. A relationship defines which of the two components is dependent on the other: first depends on the second, the first is required for the second, neither is dependent on the other, or both are dependent on the other.

component.hasRelationship

If relationship query returns any relationships, then `component.hasRelationship` returns all components attached to those relationships:

- `component.hasRelationship(`*`relationship_query`*`)`

component.relatedTo

If the component query returns any components, then `component.relatedTo` returns those components as well as all components related to them:

- `component.relatedTo(`*`component_query, numberOfLevels`*`)`

`numberOfLevels` is optional; the default number of levels is 1. If `numberOfLevels` is 1, the components' immediate relationships are returned; if `numberOfLevels` is 2, the relationships two levels out are returned (all components related to immediate related items), and so on. Use a very large number to return all related components in the blueprint.

component.dependsOn

If the component query returns any components, then `component.dependsOn` returns those components as well as the components that depend on them

- `component.dependsOn(`*`component_query, numberOfLevels`*`)`

If `numberOfLevels` is 1, the components' immediately related components are returned; if `numberOfLevels` is 2, the components related two-levels out are returned; (all components related to immediate related items), and so on. Use a very large number to return all related components in the blueprint.

component.requiredFor

If the component query returns any components, then `component.requiredFor` returns those components as well as the components on which they depend:

- `component.requiredFor(`*`component_query, numberOfLevels`*`)`

If `numberOfLevels` is 1, the immediately related components are returned; if `numberOfLevels` is 2, the components related two-levels out are returned; etc.

Working With Component States

The following clauses return components of specific states. Components can be in abstract, disabled or invalid states.

component.abstractType

Typically, component instances of abstract component types will not be used in the system. However, the following clauses will return components that are of any abstract type.

This query returns all components in the system that are of an abstract type:

- `component.abstractType`

component.disabledType

Typically, component instances of disabled types will not be used in the system. However, the following clause will return components of any disabled types.

This query returns all components in the system that are of a disabled type:

- `component.disabledType`

component.hasMissingRequiredProperty

This query returns components that are missing one or more required property values.

- `component.hasMissingRequiredProperty`

component.hasInvalidProperty

This query returns components that have one or more invalid property values:

- `component.hasInvalidProperty`

CHAPTER

3

Working With Relationships

This chapter covers the TQL clauses for working with relationship attributes and includes:

Understanding Relationship Queries

Relationship queries return all relationships in the system that match a specified relationship attribute such as a relationship name, an associated component type, or a range of component attributes defined by values and operators.

Working With Relationship Core Attributes

Relationship core attributes include: id, description, type, property, and the presence of events. The following clauses compare these core attributes with values and return the relationships that match the specified criteria.

relationship.id

Returns all relationships whose id's match the specified operator and value.

All relationships have id's that are used as internal keys and are not accessible through the Troux Blueprinting System user interface. However, if you are accessing the Troux Blueprinting System through the SOAP APIs, you have access to these id's and can use them in TQL:

- `relationship.id = value`
- `relationship.id != value`
- `relationship.id contains value`
- `relationship.id > value`
- `relationship.id < value`
- `relationship.id >= value`
- `relationship.id <= value`

relationship.type

Returns all relationships whose type matches the specified operator and value. If the type specified has subtypes, all relationships of that type or of its subtypes are returned:

- `relationship.type = value`
- `relationship.type != value`
- `relationship.type contains value`

relationship.exactType

Returns all relationships that are of an exact relationship type (does not include subtypes):

- `relationship.exactType = value`
- `relationship.exactType != value`
- `relationship.exactType contains value`

relationship.property

Returns all relationships that have a specified property that matches the specified operator and value. A parameter can be used for the property name.

- `relationship.property("property_name", datatype) = value`
- `relationship.property("property_name", datatype) != value`
- `relationship.property("property_name", datatype) contains value`
- `relationship.property("property_name", datatype) < value`
- `relationship.property("property_name", datatype) > value`
- `relationship.property("property_name", datatype) <= value`
- `relationship.property("property_name", datatype) >= value`

A property can have one of the following data types:

- string - a quoted text string
- numeric - a number value (can have decimal)
- boolean - either true or false
- link - link with a fully-qualified URL (such as http://www.troux.com)
- datetime - a date/time stamp
- Custom property types - lists of defined values. Custom property lists are named and must be called out specifically by name in the format: `propertyType (property_type_name)`.

Properties are arranged in categories and subcategories, and are identified according to their category and property name in dot-notation. For example, if a component type has a property named "USDollars" in subcategory "Currency" under category "Cost", then the full name of the property would be "Cost.Currency.USDollars".

Note that if a property or category has a dot in its name, those dots must be escaped. For example a property named "first.last" in a category "full.name" would be written "full\.name.first\.last".

relationship.hasEvent

Returns all relationships that have events with the specified severity or worse (from info to catastrophic).

For example, if you specify "warning" for the severity, relationships with warning events, failure events, and catastrophic events are returned:

- `relationship.hasEvent(info)`
- `relationship.hasEvent(success)`
- `relationship.hasEvent(warning)`
- `relationship.hasEvent(failure)`
- `relationship.hasEvent(catastrophic)`

Working With Relationships' Components

Component interactions are defined by relationships. The following clauses evaluate and return the relationships that match the specified criteria for a specified set of components.

relationship.hasComponent

If component query returns any components, relationship.hasComponent returns all relationships attached to those components:

- `relationship.hasComponent(`*`component_query`*`)`

relationship.traceRelationshipsFrom

If the component query returns any components, `relationship.traceRelationshipsFrom` traces out and returns the specified types of relationships from the components for a given direction and the specified number of levels.

If "`all`" is specified for the direction, all relationships are returned. If "`dependsOn`" is specified, only relationships that specify dependencies on other components are returned. If "`requiredFor`" is specified, only relationships that specify dependencies from other components are returned (that is, the opposite of `dependsOn`).

If `numberOfLevels` is 1, the components' immediate relationships are returned; if `numberOfLevels` is 2, the relationships two-levels out are returned; etc. To return all relationships at any level use a very large number.

- `relationship.traceRelationshipsFrom(`*`component_query`*`, all | dependsOn | requiredFor, `*`numberOfLevels`*`)`

Working With Relationship Sets

The following clauses define and return sets of relationships.

define.relationship.set

When building a complex query, sometimes you need to repeat the same sub-query several times. Rather than repeating the sub-query, it is easier and more efficient to perform the sub-query once and name it as a set. Then, you can reference the set by name multiple times in your query. You can define any number of sets, but all set definitions must occur at the beginning of a query:

- `define.relationship.set("`*`set_name`*`", `*`relationship_query`*`)`

relationship.set

Once the relationship set is defined, this clause returns all relationships in the named set. See `define.relationship.set` for more information:

- `relationship.set("`*`set_name`*`")`

Working With Relationship States

The following clauses return relationships of a certain state.

relationship.disabledType

A disabled relationship type may be a relationship that depends on or uses a disabled component type. For example, if a new software package is planned for production, relationships for computer that will run this new software can be created in the system as disabled types until the software package is ready for use.

This query returns all relationships in the system that are of a disabled type:

- `relationship.disabledType`

relationship.hasMissingRequiredProperty

This query returns components that are missing one or more required property values.

- `relationship.hasMissingRequiredProperty`

relationship.hasInvalidProperty

This query returns components that have one or more invalid property values:

- `relationship.hasInvalidProperty`

CHAPTER

4

Using Parameters and Parameter Selectors

This chapter covers TQL statements used to create and return parameters associated with components and relationships and includes:

Working With Parameters

TQL allows you to define parameters and use parameter values. Using parameters means that you can write a single query that can be selectively applied to many objects.

For example, suppose your blueprint contains 100 applications. For each application, you want to have a view that shows you the application and everything related to it. You could either write 100 queries or you could write a single query that takes the name of the application as a parameter.

Parameters can also depend on other parameters. If a parameter is defined using other parameters, then they are grayed in the user interface until a user specifies the other values required. For example, If a query includes a parameter called *location*, and *location* is defined by *building*, *floor*, and *room*, then the user can be prompted to enter or select the building, then the floor, and then the room to provide the information needed to define the parameter *location*.

define.parameter

Defines a parameter with the specified name. The Troux Blueprinting System prompts the user to enter values in a text box or an from optional parameter selector:

- `define.parameter("parameter_name", "prompt" [, parameter selector])`

For more information, see Working With Parameter Selectors on page 22.

parameter

Once a parameter is defined, this clause retrieves the parameter's value. Parameter values can be used in place of literal values for query types and other functions:

- `parameter("parameter_name")`

The following is a simple example of using a parameter:

```
define.parameter("compname", "Enter a component name")
component.relatedTo(component.name = parameter("compname"))
```

With this query, the user is prompted to "Enter a component name." Once the user enters the name and clicks Submit, the query uses the entered name as a value in the component query.

Working With Parameter Selectors

Using parameter selectors within parameter definitions allows you to present the user with a list of options to choose from rather than forcing the user to know and enter a valid value into a text box.

selectOperator

This parameter can be used any place in TQL where a comparison operator is allowed, presenting a list of possible operators to the user of the query.

- `selectOperator()`

For example, when a user runs a query with the following:

```
define.parameter("operator","Select an operator", selectOperator())
component.name parameter("operator") "Troux"
```

The user is presented a drop-down list from which to select one of the following operators. The selected operator is used in the component query:

- equal to
- not equal to
- less than
- greater than
- less than or equal to
- greater than or equal to

Note *contains* is not included in selectable operators.

selectDate

Displays a calendar-formatted date selection tool:

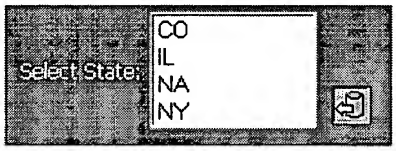
- `selectDate()`

The following example opens a `selectDate` parameter selection dialog that prompts the user to "Select a Date" and then uses that value in a component query.

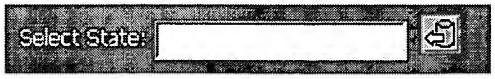
```
define.parameter("SomeDate", "Select a Date", selectDate())
component.property("Dates.Purchase_Date") = parameter("SomeDate")
```

Note Parameter selectors for existing and possible property values present the user with a selector as well as an icon for changing that selector.

Selecting existing values presents existing property value by default:



Selecting possible values presents an input box by default:



If the number of values returned is greater than the number set for the *maxParameterOptions* parameter found in *baseConfig.xml* then the user is presented with a selector appropriate to the data type for the possible range of values rather than a list of all existing values. For more information on the setting, see the *Configuration Reference.*

selectExistingComponentPropertyValue

Displays a list of all values of the named property for all components, or all values of the named property for components returned by the optional component query.

- `selectExistingComponentPropertyValue("property_name", datatype, [component_query])`

A selection list displays that has all existing values for the named property, as shown in this example:

```
define.parameter("PickState", "Select State",
selectExistingComponentPropertyValue("State", string, component.type="Location"))
component.type="Location" and
component.property("State", string) = parameter("PickState")
```

selectPossibleComponentPropertyValue

Displays the appropriate input format for entering a value for the property, based on the selected property's data type.

- `selectPossibleComponentPropertyValue("property_name", datatype, [component_query])`

In example:

```
define.parameter("PickState", "Select State",
selectPossibleComponentPropertyValue("State", string, component.type="Location"))
component.type="Location" and
component.property("State", string) = parameter("PickState")
```

selectExistingRelationshipPropertyValue

Displays a list of all values of the named property for all relationships, or all values of the named property for relationships returned by the optional relationship query.

- `selectExistingComponentPropertyValue("property_name", datatype, [relationship_query])`

In example:

```
define.parameter("PickDate", "Select a date",
selectExistingRelationshipPropertyValue("DateEst", datetime, relationship.type="RunsOn"))
relationship.property("DateEst", datetime) = parameter("PickDate")
```

selectPossibleRelationshipPropertyValue

Displays the appropriate input format for entering a value for the property, based on the selected property's data type.

- `selectPossibleRelationshipPropertyValue("property_name", datatype, [relationship_query])`

In example:

```
define.parameter("MonthYear", "Pick a Month and Year",
selectPossibleRelationshipPropertyValue("Date Established", datetime,
relationship.type="RunsOn"))
relationship.type = "RunsOn" and
relatinships.property("Date Established", datetime) = parameter("MonthYear")
```

selectComponentType

Displays the components that are of a specific type (including its subtypes) and optionally, of a specific state (abstract, disabled, notAbstract, notDisabled, or abstractOrDisabled.

- `selectComponentType("component_type" [, abstract | disabled | notAbstract | notDisabled | abstractOrDisabled ])`

Presents a list of component type and its subtypes. If "abstract" is specified in selectComponentType, only abstract types are shown in the type selector. If "disabled" is specified, only disabled types are shown and so on.

```
define.parameter("AbsCompType", "Select an abstract component Type",
selectComponentType("Generic Component", abstract)
component.type = parameter("AbsComptype")
```

selectRelationshipType

Displays the relationships that are of a specific type and optionally, of a specific state (disabled or notDisabled).

- `selectRelationshipType("relationship_type" [, disabled | notDisabled ])`

Presents a list of relationship type and its subtypes. If "disabled" is specified, only disabled types are shown.

```
define.parameter("DisRelated", "Select a disabled relationship type",
selectRelationshipType("Generic Relationship", disabled))
relationship.type = parameter("DisRelated")
```

enumeration

Displays a list of selections, from which the user can select one or more items. An enumeration is named during creation, and the *enumeration Name* must be used in queries. The parameter is assigned the value(s) of the selection(s).

- `enumeration(("selection1","value1") [, ("selection2","value2"), ...] )`

The following query allows the user to select an item from a text-based list to set a value:

```
define.parameter("pStatus", "Application Status",
  enumeration(("Development","1"),("Production","2"),("Retired","3")))
```

The clause `define.parameter` is used to define the parameter `pStatus`. The parameter selector *`enumeration`* populates a list of selections. One or more of these names is selected by the user and becomes the value(s) of the parameter *`pStatus`*. The parameter can then be used in a parameter clause to retrieve the parameter's value.

Working with Data Type-Dependent Selectors

For some queries the user must pick a property definition (such as "width" or "region") as a parameter. In some cases, the property that the user selects may require a datatype to resolve query ambiguity. Because of this, the results of the parameter selectors are special types of parameter values. The examples for the following selectors include statements that illustrate this requirement.

selectComponentPropertyByType

Displays the components with properties of a specified type selected.

- `selectComponentPropertyByType(parameter("type"))`

The following query restricts the list of existing values to those on components of the chosen types and allows the user to select a property. In cases where multiple data types have the same property name, it uses the appropriate type:

```
define.parameter("Type", selectComponentType("Generic Component")
define.parameter("Property", selectComponentPropertyByType(parameter("Type")))
define.parameters("Value",selectExistingComponentPropertyValue(parameter("Proper
ty"),component.type = parameter ("Type")))
```

This query prompts the user to choose a type, property and then a value for that property and returns the components that match the criteria:

```
component.type = parameter ("Type") and
component.property(parameter("Property")) = parameter("Value")
```

selectRelationshipPropertyByType

Displays the relationships with properties of a specified type that is selected by the user

- `selectRelationshipPropertyByType(parameter("type"))`

The following query restricts the list of existing values to those on relationships of the chosen types and allows the user to select a property. In cases where multiple data types have the same property name, it uses the appropriate type:

```
define.parameter("type", selectRelationshipType("Generic Relationship")
define.parameter("property",
selectRelationshipPropertyByType(parameter("type")))
define.parameters("value",selectExistingRelationshipPropertyValue(parameter("pro
perty"),relationship.type = parameter ("type")))
```

This query prompts the user to choose a type, property and then a value for that property and returns the relationships that match the criteria:

```
relationship.type = parameter ("type") and
relationship.property(parameter("property")) = parameter("value")
```

The parameter values defined by these three parameter selectors require a particular context to be useful. This can only be used when a property is *always* expected, and not an other entity such as a component or a relationship:

```
define.parameter("prop",selectComponentPropertyByType("Computer"))
component.type  = parameter("prop")
```

This example would not work because the parameter *prop* is defined as a property in the first statement not a component.

APPENDIX

A

Example Views

This section provides three examples of queries written in TQL. All the examples use the same data set (components and relationships).

View A. Exploring a Database Server's Related Components

The purpose of this view is to show a selected database server, or servers, and its first-level related components.

TQL Query

The following component query creates this view.

```
define.parameter("pServer", "Database",
   selectComponentFrom(component.type="Database"))
define.component.set("targetComponent",
   component.name = parameter("pServer")
   and component.type = "Database")
component.set("targetComponent")
   or component.relatedTo(component.set("targetComponent"))
```

Query Explanation

The clause define.parameter is used to define the parameter pServer. The parameter selector selectComponentFrom populates a list of component names for components of type "Database Server" (component.type = "Database Server") and presents the list to the user.

```
define.parameter("pServer", "Database Server",
   selectComponentFrom(component.type="Database Server"))
```

One or more of these names is selected from the list by the user and becomes the value of the parameter *pServer*. Then the clause define.component.set populates a set named *targetComponent* with components matching both of the following criteria: having a name that matches the value of the parameter *pServer* (component.name = parameter("pServer")) *and* being of type "Database Server" (component.type = "Database Server"). The component type needs to be filtered this way in case the same name is used for components of different types.

```
define.component.set("targetComponent",
   component.name = parameter("pServer")
   and component.type = "Database Server")
```

The clause component.set returns the set of components named targetComponent. Also the clause component.relatedTo returns components immediately related to the set of components named targetComponent. In this example, only immediately related components are returned by component.relatedTo because a number of levels is not specified and the default is 1. Components returned by either of these clauses are shown in the view because the conjunction *or* is used.

```
component.set("targetComponent")
   or component.relatedTo(component.set("targetComponent"))
```

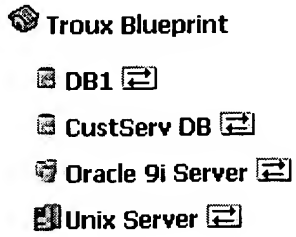
Resulting View

Considering our dataset, the user is presented with a list that contains only "Oracle9i" because this is the only component of the type "Database Server". So the user selects "Oracle9i".

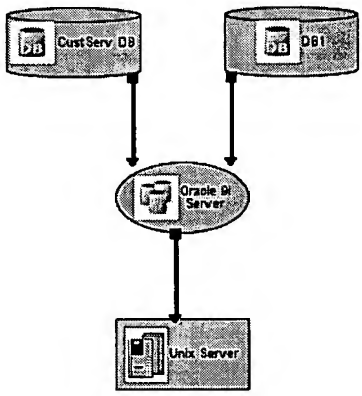
Now consider the following relationships for "Oracle9i" and its related components three-levels out.

First Component	Dependency	Relationship Type	Second Component
Oracle9i	Depends on	Runs on	Unix server
Oracle9i	Required for	Is used by	DB1
DB1	Required for	Is used by	Bank App
Bank App	Required for	Is used by	Business Unit 2
Bank App	Depends on	Runs on	Bserver
Oracle9i	Required for	Is used by	CustServ DB
CustServ DB	Required for	Is used by	Cust Serv
Cust Serv	Depends on	Runs on	Blade 6

The component query returns the selected database server, or servers, and its first-level related components, so the resulting view is:



The results can be diagramed:



View B. Exploring an Application's Subcomponents

The purpose of this view is to show a selected application's subcomponents.

TQL Query

The following component query creates this view.

```
define.paramter("pApplication", "Application Name",
   selectComponentFrom(component.type="Application"))
define.component.set("appModules",
   component.hasParent(component.name=parameter("pApplication"))
     and component.type="Application Module")
component.set("appModules")
```

Query Explanation

The clause define.parameter is used to define the parameter pApplication. The parameter selector selectComponentFrom populates a list of component names for components of type "Application" (component.type = "Application") and presents the list to the user.

```
define.parameter("pApplication", "Application Name",
   selectComponentFrom(component.type="Application"))
```

One or more of these names is selected from the list by the user and becomes the value of the parameter pApplication. Then the clause define.component.set populates a set named appModules with components matching both of the following criteria: having a parent component (component.hasParent) whose name matches the value of pApplication (component.name=parameter("aApplication")) and being of type "Application Module" (component.type="Application Module").

```
define.component.set("appModules",
   component.hasParent(component.name=parameter("pApplication"))
     and component.type="Application Module")
```

The clause component.set returns the components in the appModules set.

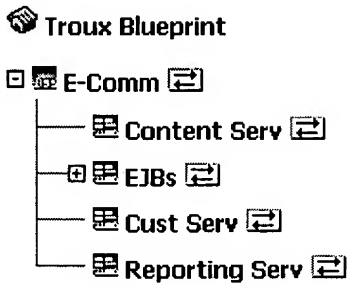
```
component.set("appModules")
```

Resulting View

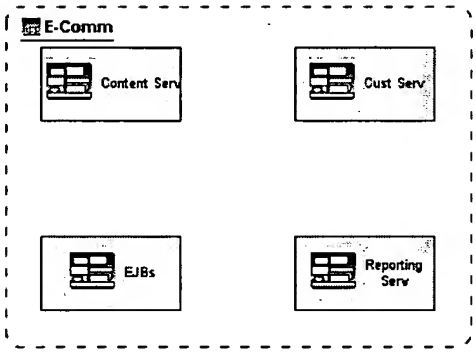
The relevant components of our data set are the applications and application modules:

- Alert App
  - Alert Serv
  - Compute Engine
- Bank App
- E-Comm
  - Content Serv
  - EJBs
  - Cust Serv
  - Reporting Serv

If the user selects "E-Comm", then the results are:



The results can be diagrammed:



View C. Exploring Components Used by Business Unit 1

The purpose of this view is to show the components used by Business Unit 1 but exclude the relationships of type "uses".

TQL Query

The following component query shows the components of type "Application" that Business Unit 1 depends on two-levels out.

```
component.dependsOn(component.name="Business Unit 1", 2)
```

Adding the following relationship query to the view excludes the relationships of type "uses" from the view.

```
relationship.type != "uses"
```

Query Explanation

In the component query, the clause component.name returns the components with the name "Business Unit 1". Then component.dependsOn returns the components required for those

components as many as two-levels out.

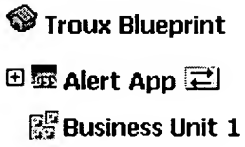
In the relationship query, the clause relationship.type returns all relationships not of type (!=) "uses" or its subtypes.

Resulting View

Consider the following relationships for "Business Unit 1" and its related components.

Component Name	Relationship Type	Relationship Description	Target Component
Business Unit 1	Depends on	Uses	Alert App
Alert App	Required For	Is used by	Business Unit 2

The results of this view are:



The diagram also does not show the relationship.

If the relationship query is not used in the view, the results show the business unit relationship as in the following image.